

REMARKS

Dependent claims 3 and 9 are objected to under 37 CFR 1.75 (c) as failing to further limit the subject matter of the previous claims. Applicants note that each of the materials listed in claim 3 exists in a ceramic form, thus claim 3 is not broader than claim 1. Claim 9 is amended to delete the word objected to by the Examiner. Applicants respectfully request that the Examiner withdraw his objection to claims 3 and 9.

Claims 1-17 and 23 are rejected under 35 U.S.C. 112 second paragraph as being indefinite. Applicants respectfully submit that all claims meet the requirements of 35 U.S.C. 112.

Claims 1-9, 16, 17, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama, U.S. Patent 4,012,833. Applicants respectfully traverse the rejection. Claim 1 is amended to recite "a path from the at least one copper layer to the ceramic core is thermally conductive." In contrast, Akiyama's Fig. 4B shows an epoxy resin layer 33 disposed between black ceramic substrate 34 and copper layer 32. Epoxy resin is not thermally conductive.

Further, Applicants respectfully submit that it would not be obvious to modify the thickness of the copper layers on Akiyama's device. The Examiner states "Although, Akiyama does not disclose the copper layer having a thickness of at least 4 mils, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the adjustment regarding the thickness of the layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art." Applicants respectfully disagree. First, Applicants have found no teaching in Akiyama that recognizes the thickness of the copper in copper marks 32' and copper layer 32 as a result-effective variable. Applicants respectfully request that the Examiner point to a passage in Akiyama that teaches as much. Second, Akiyama's design requires that portions of layer 32 be formed into "comb-like electrodes each being substantially 0.5 mm in pitch, 100 μ in width, and 225

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μ in length." See column 3 line 68 to column 4 line 2. These electrodes seem to be formed by photolithography: see column 3, lines 64-66 which refer to a "photo resist being used as a mask to form a copper layer 32 and copper marks 32' in predetermined patterns." Forming such features on thicker copper layers that are 4 mils thick would be difficult, given the tolerances of photolithography. As the thickness of the copper increases, the problem gets worse. Accordingly, there is no expectation that modifying Akiyama's copper layers to be thicker would be successful.

For the above reasons, claim 1 is allowable over Akiyama.

Claims 2-9, 16, 17, and 23 depend from claim 1 and are therefore allowable over Akiyama for at least the same reasons.

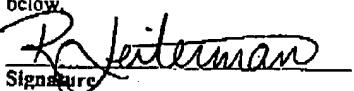
Regarding claim 23, as noted above, Akiyama's device includes a thermally insulating layer between the ceramic and the copper, thus there is no expectation that Akiyama's device could be modified to have a substrate with "a thermal conductivity of at least 24 W/m K" as recited in claim 23.

Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama as applied to claim 1, and further in view of Raj et al., U.S. patent publication 2002/0175339. The Examiner states "Akiyama substantially discloses the limitations in the claim . . . except for a second substrate layer between the copper substrate and the light emitting device. Raj discloses a transceiver in figure 4; wherein light emitting devices 110 are mounted on a substrate 106. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use another substrate along with the corresponding light emitting devices on that substrate on the copper substrate of the Akiyama's structure in order to utilize the structure in applications such as fiber optics, as Raj reference discloses."

Applicants respectfully traverse the rejection. Claims 10-15 depend from claim 1. Raj adds nothing to the deficiencies of Akiyama with respect to claim 1, thus claims 10-15 are

allowable over Raj and Akiyama for at least the same reasons claim 1 is allowable over Akiyama. In addition, the Examiner has provided no reason to modify either Akiyama or Raj to include two substrates. Applicants respectfully request that the Examiner clarify why a person of skill in the art would be motivated to use Raj's substrate 106 *in addition to* Akiyama's structure. The Examiner has not explained why a second, additional substrate would be required to, as the Examiner claims, "utilize [Akiyama's] structure in applications such as fiber optics."

In view of the above arguments, Applicants respectfully request allowance of claims 1-17, 23, and 24. Should the Examiner have any questions, the Examiner is invited to call the undersigned at (408) 382-0480.

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Respectfully submitted,



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